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(21)Application number : 53-009175

(71)Applicant : MITSUBISHI RAYON CO LTD

(22)Date of filing : 30.01.1978

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(54) COMPOSITE HOLLOW YARN AND GAS SELECTIVE PERMEATING METHOD USED ABOVE YARN

(57)Abstract:

PURPOSE: Membrane material for composite gas separation having superior gas selective permeating property and permeating quantity, carried a high molecular thin film on porous polyolefin hollow yarn superior in N2 gas permeating velocity of hollow wall.

CONSTITUTION: High molecular thin film is carried on porous PP or PE hollow yarn, having 50W5000 μ of inner diameter, 5W200 μ of wall thickness. less than 5 μ of fine hole diameter of wall face and more than 100/m².hr.0.5 atm. of N2 gas permeating velocity of the wall and composite hollow yarn having gas selective permeating property, is obtained. On this occasion, PE, PP, polybutadiene etc. or copolymer mainly composed of the above materials, are used for the material of high molecular thin film. Then, aimed composite hollow yarn is made by removing solvent after applying a suitable solvent solution of the high molecular materials on the porous hollow yarn or dipping the hollow yarn in the solvent solution. The above gas selective permeable membrane material is able to apply for the purpose of concentration and separation of H2, N2 O2 etc. or separation of gas in gas-liquid mixture etc. very effectively.

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(21)Application number : 09-210827

(71)Applicant : NITTO DENKO CORP

(22)Date of filing : 05.08.1997

(72)Inventor : WATANABE YOSHINOBU
HIGUCHI HIROYUKI

(54) POROUS MEMBRANE AND BATTERY SEPARATOR USING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a porous membrane capable of being used as a battery separator having not only low electric resistance and good SD characteristics on the normal application of electricity but also excellent heat resistance.

SOLUTION: A PP film having a melt index(MI) of ≤ 0.6 and a crystallization temperature of $\geq 120^{\circ}\text{C}$ is oriented at a low temperature and further oriented at a high temperature to form a porous PP film. The orientation at the low temperature is carried out at a temperature of -20 to 80°C in an orientation ratio of 20-400%, and the high temperature orientation is carried out in a temperature range of $(T_m-40)^{\circ}\text{C}$ to $T_m^{\circ}\text{C}$ [T_m is the crystal melting point ($^{\circ}\text{C}$) of the film] in an orientation ratio of 10-500%. Thereby, a porous membrane having a porosity of 30-55% and a heat-resistant temperature of $\geq 190^{\circ}\text{C}$ is obtained. The portion of the PP is 50-100 wt.% of the whole body of the membrane. The preferable range of the crystallization temperature of the PP is $\geq 123^{\circ}\text{C}$.

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(21)Application number : 10-099633

(71)Applicant : UBE IND LTD

(22)Date of filing : 10.04.1998

(72)Inventor : KIUCHI MASAYUKI
 TERADA SUMIO
 MITSUI HIDENORI
 KAWABATA KENJI

(54) MANUFACTURE OF POROUS FILM AND POROUS FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a film having large porosity, maximum pore diameter, air permeability and excellent lithium ion conductivity by drawing the film by setting the width directional length of the film constant.

SOLUTION: Desirably, after longitudinally uniaxially drawing a film, reduction in the width directional film length generated at uniaxially drawing time is restored by lateral drawing. The film contains high molecular weight PP on which porosity of a porous film is 30 to 80%, a maximum pore diameter is 0.02 to 2 μ m, a Gurley value is 50 to 800 sec/100 cc, a pentad percentage is not less than 95% and number average molecular weight is not less than 80 thousand. A polyolefine film of polypropylene and polyethylene can be used as a material of the film, and may be a single layer or a multilayer. High porosity of polypropylene having a high pentad percentage is easily realized by high molecular weight so far unusable due to being difficult to realize high porosity in spite of being excellent in mechanical strength to be also indirectly useful for improving mechanical strength of a battery separator by a drawing method.

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(21)Application number : 01-199760

(71)Applicant : TORAY IND INC

(22)Date of filing : 31.07.1989

(72)Inventor : WATANABE TETSUO
 UEMURA TADAHIRO
 KURIHARA MASARU

(54) COMPOSITE MEMBRANE FOR USE IN PERVAPORATION

(57)Abstract:

PURPOSE: To obtain a composite membrane for use in pervaporation having a repeating unit ratio of at least 0.5 to separate a highly conc. mixture of org. liquids by means of a porous supporting body made from polymers having an active layer and the repeating unit expressed by a specific general formula.

CONSTITUTION: The supporting body having a porous membrane is made by a dry and wet or wet method from a polymer having the repeating unit expressed by the general formula (Ph-SO_x) or ((Ph-SO_x)-(Ph-Y)) (wherein Ph represents phenylene group, Y is selected from SO, SO₂ and CO and X is zero, 1 or 2) and a polymer having the repeating unit expressed by the general formula (Ph-S) and ((Ph-S)-(Ph-Y)) (wherein Ph and Y are the same as in the above formula). Such porous membrane is oxidized by using an oxidizing agent such as peracetic acid. The porous supporting body thus obtained is covered with an active layer (a high-molecular substance such as polydimethylsiloxane having a separating function by pervaporation), thereby permitting the separation of a highly conc. mixture of org. liquids.

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